

Appln. No. 10/614,149
Amdt. dated: October 27, 2004
Reply to Office Action dated August 4, 2004

REMARKS

The foregoing amendments and these remarks are in response to the Office Action dated August 4, 2004. This amendment is timely filed.

In the Office Action, claims 1-2 and 10-14 were rejected under 35 U.S.C. §103(a). Claims 13-20 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-10 of copending application number 10/632,632. Claims 13 was also provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1 and 19 of copending application number 10/421,305. Claims 3-9 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 1 and 13 have been amended for greater clarity. New claim 21 has been added. Please charge the necessary fee for the additional claims to Deposit Account No. 50-2884

I. Review of Applicant's Invention

Prior to addressing the Examiner's rejection on art, a brief review of Applicant's invention is appropriate. As recited in amended claim 1, the invention concerns a waveguide with a structure contained therein defining at least one cavity. The cavity structure is at least partially formed from a dielectric material. The waveguide has at least a first operational state in which the cavity is filled with a conductive fluid and at least a second operational state in which the cavity is purged of the conductive fluid.

As recited in independent claim 13, the invention also concerns a method of controlling the mode of a transmission line which includes providing within a waveguide

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at least one cavity that is at least partially formed of a dielectric material. The method also includes at least partially filling the cavity with a conductive fluid while constraining the conductive fluid with the dielectric material within the cavity to control an operational characteristic of the waveguide.

Newly added independent claim 21 provides an alternative recitation of the invention. As stated therein, the invention concerns a method for controlling the mode of a transmission line which includes constraining a conductive fluid in at least one cavity structure at least partially formed of a dielectric material and contained within the waveguide. A volume of the conductive fluid contained within the cavity structure is selectively varied to control an operational characteristic of the waveguide in response to a waveguide mode control signal.

II. Claim Rejections on Art

Turning now to the Examiner's rejection, it is noted that claims 1-2 and 10-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,604,592 to Pinson (hereinafter "Pinson") in view of U.S. Patent No. 6,743,371 to John et al. (hereinafter "John et al."). Applicants respectfully traverse the Examiner's rejection.

In Pinson, a fixed volume of ferromagnetic fluid 64 is disposed within a waveguide channel cavity 54. A pair of permanent magnets 56, 58 holds the ferromagnetic fluid in place inside the cavity within a channel 66. Energizing a set of electromagnets 60, 62 repositions the ferromagnetic fluid within the cavity, causing a full or partial obstruction of the waveguide 52. Pinson, Col. 3, lines 28-58.

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In contrast to Pinson amended claims 1 and 13, and new claim 21 recite a cavity structure within a waveguide where the cavity is at least partially formed of a dielectric material. Support for this limitation can be found in Applicants' specification in Paragraphs 24-25 on page 10. Specifically, it is stated therein that the cavities can be formed from glass, plastic, ceramic, or any other dielectric material that can contain the conductive fluid. In Applicants' invention, the need for complex magnetic control of the fluid is avoided. Instead, the conductive fluid in Applicants invention is constrained by the dielectric walls of the cavity and a fluid processor directs the necessary volume of conductive fluid to the internal cavities as needed. Pinson does not disclose an internal cavity of the waveguide at least partially formed of a dielectric material.

Further, Applicants note that amended claim 1 recites a first operational state in which the at least one cavity is "filled" with conductive fluid, and a second operational state in which the cavity is "purged" of conductive fluid. This feature is not shown in Pinson. Regardless of how the Examiner wishes to characterize the waveguide and channels in Pinson, there is no cavity in that reference that is "filled" in one state and "purged" in a second state.

With regard to claim 13, Applicants also direct the Examiner to the newly added limitation which recites "constraining said conductive fluid with said dielectric material." Applicants note that Pinson fails to disclose that the conductive fluid is constrained by the dielectric material forming the cavity within the waveguide. Instead, Pinson's fluid is constrained by magnetic force and the conductive waveguide walls.

Finally, Applicants note that John et al. does not make up for the deficiencies of Pinson. Instead, that reference merely discloses that ferromagnetic fluids can be

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conductive. Nowhere in John et al. is it disclosed or suggested that the operating characteristics of a waveguide can be controlled by selectively varying a volume of conductive fluid contained within a cavity defined within a waveguide. Moreover, John et al does not disclose or suggest the use of dielectric cavities within waveguides for constraining a conductive fluid as recited in Applicants claims 1, 13, and 21. In view of the foregoing, Applicant's respectfully submit that claims 1-21, as amended, are not rendered obvious by the combination of Pinson and John et al.

III. Double patenting rejection

Claims 13-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-10 of copending application number 10/632,632. Claims 13 is also provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1 and 19 of copending application number 10/421,305. In response to these double patenting rejections, applicants are submitting herewith a terminal disclaimer. Please charge Deposit Acct. No. 50-2884 in the amount of \$110, pursuant to 37 CFR 1.20(d). Accordingly, the double patenting rejection is believed to have been overcome.

IV. Allowable Subject Matter

Claims 3-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In response, Applicants have now amended claims 3, 4 and 7 to place them in independent form. Accordingly, claims 3-9 are now believed to be in condition for allowance.

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V. Conclusion

For the foregoing reasons, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicant requests that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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